AMENDMENTS TO THE CLAIMS

This listing replaces all prior versions and listings of claims in the application.

Listing of Claims

1.-31. (Cancelled)

32. (Currently Amended) A wavelength separation device comprising:

a metal film or a plurality of metal islands having a plurality of openings having a width that is less than at least one first predetermined wavelength of incident radiation to be provided onto the film or the islands;

wherein:

the metal film or islands are configured such that the incident radiation is resonant with at least one plasmon mode on the metal film or metal islands; [[and]]

transmission of radiation having at least a second peak wavelength and a third peak wavelength different from the second peak wavelength is enhanced through the plurality of openings in the metal film or the plurality of metal islands due to the resonance with the at least one plasmon mode;

the metal film or metal islands comprise at least two cells;

a first period of first openings in the first cell is different than a second period of second openings in a second cell;

a transmission of the radiation having the second peak wavelength through the first openings in the first cell is enhanced due to the first period; and

a transmission of the radiation having the third peak wavelength through the second openings in the second cell is enhanced due to the second period.

33. (Cancelled)

34. (Currently Amended) The device of claim [[33]] 32, wherein:

the metal film or metal islands comprise at least ten cells;

a period of openings in each of the cells is different than periods of openings in each of the other cells; and

a transmission of the radiation having a different peak wavelength through openings in each cell is enhanced due to the period of the openings in the respective cell.

35. (Currently Amended) The device of claim 34, wherein:

the metal film or metal islands comprise at least thirty cells;

a period of openings in each of the cells is different than periods of openings in each of the other cells;

a transmission of the radiation having a peak wavelength through openings in each cell is enhanced due to the period of the openings in the respective cell; and

radiation transmitted through each cell has a peak wavelength that differs by at least 1[[0]] nm from peak wavelengths of radiation transmitted through the other cells.

36. (Currently Amended) The device of claim [[33]] 32, wherein the period of openings across the metal film or metal islands is chirped.

37. (Original) The device of claim 35, wherein a period of openings in each cell ranges from about 250 nm to about 700 nm and a width of each opening ranges from about 20 nm to about 80 nm.

38.-40. (Cancelled)

41. (Original) The device of claim 32, wherein the openings comprise slits located in the metal film, the slits having a length that is at least ten times larger than the width.

42. (Cancelled)

43. (Original) The device of claim 32, wherein the device comprises a plurality of self assembled metal islands located on a radiation transparent substrate.

44. (Original) The device of claim 43, wherein the substrate comprises a plurality of ridges and the metal islands are formed asymmetrically on the plurality of ridges.

45. (Cancelled)

46. (Currently Amended) The device of claim 32, wherein:

the device comprises an N channel monochromator having N cells, where N is an integer between [[10]] 3 and 10,000;

each cell size is ~~about 50 to~~ less than about 500 microns;

each cell contains at least one opening in the metal film or metal islands; and

each cell is adapted to enhance transmission of radiation having a different peak wavelength than a peak wavelength of radiation transmitted through the other cells.

47. (Original) The device of claim 46, wherein the monochromator length, width and thickness are each less than 1 cm.

48. (Original) A spectrum analyzer comprising:

the device of claim 32; and

a photodetector.

49. (Original) The analyzer of claim 48, wherein the photodetector comprises a CCD array, a CMOS active pixel array or a focal plane array optically coupled to the metal film or the metal islands without utilizing diffractive optics.

50. (Currently Amended) The analyzer of claim 48, wherein:

[[The]] the photodetector is optically coupled with the wavelength separation device and is adapted to detect a radiation transmitted through the wavelength separation device, the

transmitted radiation having a range of peak wavelengths enhanced by resonance with a plasmon mode on the metal film or metal islands of the wavelength separation device.

51.-71. (Cancelled)

72. (Currently Amended) A wavelength separation method, comprising:

providing incident radiation having a range of wavelengths onto a metal film or a plurality of metal islands having a plurality of openings having a width that is less than at least one first predetermined wavelength of incident radiation, such that the incident radiation is resonant with at least one plasmon mode on the metal film or metal islands; and

providing transmitted radiation through the plurality of openings such that the transmitted radiation is simultaneously separated into a plurality of passbands having different peak wavelengths;

wherein the metal film or metal islands comprise at least two cells;

wherein a first period of first openings in the first cell is different than a second period of second openings in a second cell;

wherein a transmission of the radiation having the second peak wavelength through the first openings in the first cell is enhanced due to the first period; and

wherein a transmission of the radiation having the third peak wavelength through the second openings in the second cell is enhanced due to the second period.

73. (Original) The method of claim 72, further comprising separately detecting each transmitted radiation passband.

74. (Original) A surface plasmon resonant optical device, comprising:

a radiation transparent substrate; and

a plurality of metal islands on the substrate;

wherein:

adjacent metal islands are separated by a distance that is less than at least one first predetermined wavelength of incident radiation to be provided onto the device; and

the metal islands are configured such that the incident radiation is resonant with at least one plasmon mode on the metal islands, thereby enhancing transmission of radiation having at least one second peak wavelength between the plurality of metal islands.

75. (Previously Amended) The device of claim 74, wherein:

the first and the second wavelengths are 700 nm or less and the adjacent islands are separated by less than 100 nm;

the array of transparent regions between the plurality of metal islands have a period, a_o, such that the transmission of the radiation between the plurality of metal islands is enhanced due to the period of the array of transparent regions;

the transparent regions comprise slits having a length that is at least ten times larger than the width; and

the period a_o is about 200 to about 700 nm for visible light incident radiation.

76.-80. (Cancelled)

81. (Original) The device of claim 74, wherein the plurality of metal islands are located on a plurality of ridges on the transparent substrate.

82.-87. (Cancelled)

88. (Original) The device of claim 74, wherein the plurality of metal islands comprise a plurality of discrete metal islands that are not connected to each other.

89.-119. (Cancelled)

120. (Previously Presented) The device of claim 74, wherein:

the width of the transparent regions at their narrowest point ranges from about one to about three penetration depths of surface plasmon fields in the metal islands when incident radiation is provided on the metal islands.

121.-128. (Cancelled)

129. (Previously Presented) The device of claim 32, comprising two or more stacked metal films or two or more layers of metal islands, each metal film or layer of metal islands contains a two dimensional array of a plurality of openings having a width that is less than at least one first predetermined wavelength of incident radiation to be provided onto the film or the islands, wherein the metal film or islands are configured such that the incident radiation is resonant with at least one plasmon mode on the metal film or metal islands.

130.-133. (Cancelled)

134. (New) The device of claim 32, wherein the device comprises the metal islands having a thickness of 10-30 nm.

135. (New) The device of claim 134, wherein each opening has a width of 10-100 nm.

136. (New) The device of claim 135, wherein a period a_o of the openings is greater than 200 nm.